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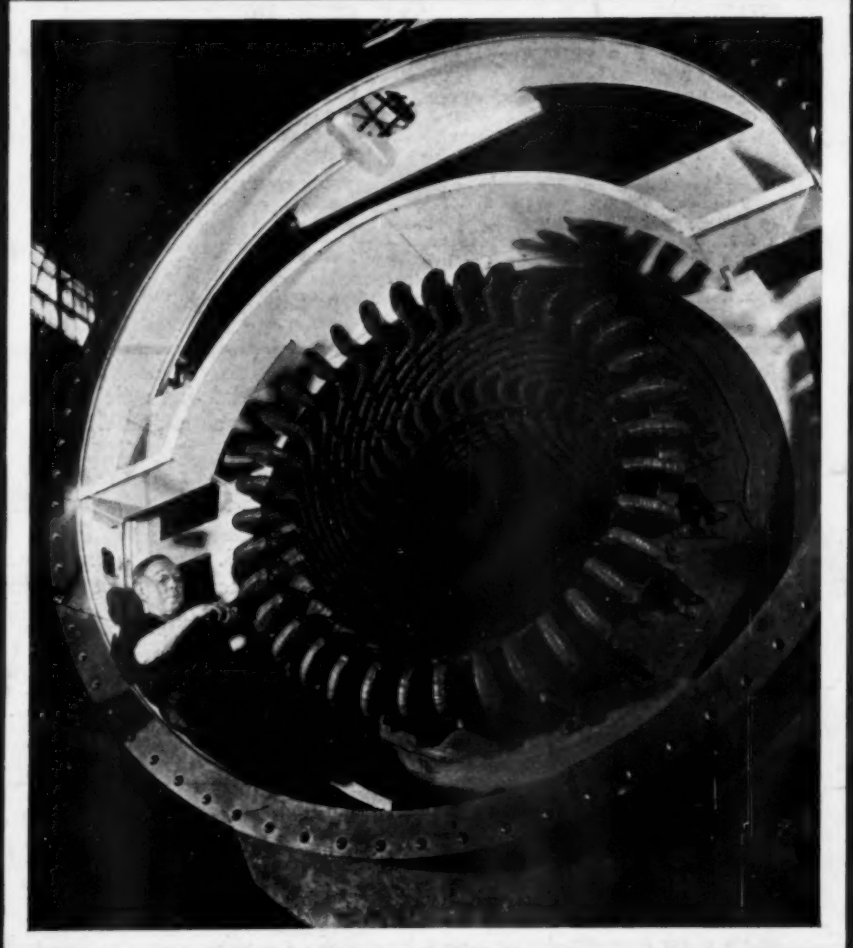
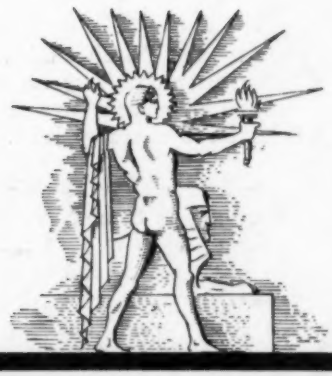
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





November 8, 1941

Power

See Page 303

A SCIENCE SERVICE PUBLICATION

Do You Know?

To get much-needed *scrap* metal, Japan is salvaging sunken ships.

Dakar, says a geographer, is the only city—as we think of cities—in all West Africa.

White *plastic* traffic lines applied to roads instead of white paint are said to have good wearing qualities.

A new kind of transparent *glass* building block provides "almost window-like vision" for panel use in non-transparent glass walls.

The electron microscope reveals that *smoke* particles from burning metals have characteristic forms, many of them crystalline.

Scientists have extracted from *ragweed* pollen a colorless chemical containing nitrogen, believed to be a major cause of hay-fever.

Cases for storing *silver* are apt to be red, gray, green or tan, rather than white, because sulfur in bleached goods may cause tarnish.

At some British clinics, children are given a special *black currant* syrup, reported to contain five times as much vitamin C as orange juice.

Indians who send *code messages* for the Army in their native languages may refer to tanks as turtles, and airplanes by insect names, and in this un-military talk the messages are doubly disguised by phrase and by language.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

AERONAUTICS

How far has a parachutist intentionally jumped without pulling his ripcord? p. 294.

ANTHROPOLOGY

What important information is lacking about American feet? p. 300.

ARCHAEOLOGY

Where can pyramids be found in the United States? p. 291.

ASTRONOMY

How old is the sun? p. 301.

What job is waiting for competent amateur astronomers? p. 295.

BOTANY

How can you demonstrate the tendency of plant roots to grow downward? p. 297.

DENTISTRY

What has Deaf Smith County, Texas, to teach the nation? p. 292.

Why do false teeth look false? p. 292.

MEDICINE

How has the defense program snatched away the cure for gray hair? p. 293.

What gland disorder may cause pyorrhea? p. 299.

What operation may prolong the lives of patients with malignant high blood pressure? p. 291.

What remedy has been found for bacillary dysentery? p. 300.

What serious illness is relieved by removal of the thymus gland? p. 302.

What substance produced by germs may be better for sinus and other infections than the sulfa drugs? p. 299.

PHYSICS

How does an acoustic mine work? p. 296.

What does an aurora smell like? p. 295.

PLANT PATHOLOGY

How do plants use cork for their protection? p. 302.

PSYCHIATRY

How can vitamin B_1 make safer the insulin shock treatment for mental disease? p. 294.

PUBLIC HEALTH

What winged enemy is more of a threat to the Burma Road than Japanese flyers? p. 298.

VETERINARY MEDICINE

How can hogs be kept free from cholera? p. 295.

ZOOLOGY

In what way is "Pinkie" the pink-eyed opossum unique? p. 293.

Wind is the main hazard to *parachute jumpers,* Army doctors report.

Gray wild *wolves* and black sheep dogs have been crossed establishing a hybrid line for study, a geneticist reports.

High-speed *photography* proves useful in determining correct cutting angles for cutting metals with machine tools.

Peanut oil and charcoal are fuels to be used by motor vehicles on the new desert road from French North Africa to Dakar.

Before becoming stale or rancid, most *nuts* become almost tasteless.

A *giant panda* captured in China will be brought to the New York Zoo.

The U. S. Army's new *shoe fitting* machine takes three foot measurements, and measures both feet at one time.

A health officer says a sanitary *milk* supply is very important—one-fifth of the average diet is cows' milk in some form.

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MEDICINE

Save Patients With Malignant Type of High Blood Pressure

Mortality Following Medical Treatment Alone Has Been 99%; Operation Prolongs Life For Years

FOR the first time, apparently, patients with the type of high blood pressure known as malignant and hitherto considered hopeless have a chance of prolonged survival. That chance is a nerve-cutting operation which enabled one out of every three patients to survive five years or longer, Dr. Ward Wilson Woods and Dr. Max Minor Peet, of the University of Michigan Medical School, report (*Journal, American Medical Association,* Nov. 1).

The mortality of patients with the same kind of high blood pressure following medical treatment was 99%.

Symptoms are relieved in about 85% of patients operated on, leading the doctors to believe the operation is justifiable in certain cases, regardless of the likelihood of prolonged survival.

Not all patients with high blood pressure are suitable for operation. Among those that are, it offers a better chance than medical treatment when their ailment is a type in which blood pressure is high and there is spasmodic contraction of the tiny blood vessels in the eyes. When this eye condition is accompanied by hardening of the tiny arteries in the retina, the outlook following operation is less favorable.

In their detailed report of results in 76 out of 350 patients who have had the operation, the Michigan doctors suggest a new classification of high blood pressure patients according to conditions observed in their eyes which would be useful in determining whether patients will respond best to medical or surgical treatment.

Their results "lend credence to the theory," they state, that the operation relieves high blood pressure by relieving constriction of blood vessels in the kidneys. If this constriction is due to spasmodic contraction of the blood vessel walls, it probably can be reversed by cutting the nerves that cause such contraction. If, on the other hand, the constriction is due to hardening and thickening of the blood vessel walls, it is probably not reversible.

Science News Letter, November 8, 1941

HYDROMATIC

This array represents a new development in aircraft controlled-pitch propellers. They will be manufactured by the Nash-Kelvinator Corporation in a former auto plant in Lansing, Mich.

ARCHAEOLOGY

Illinois Rivals Egypt In Pyramids and Ruins

EXPLORING Egypt's pyramids is "out" these days, but stay-at-home archaeologists who have been excavating American pyramids, report finding archaeological treasures as rich as those of Egypt.

Pyramids, stone slab coffins and palisade defenses which figured in prehistoric Indian life and death have been unearthed at the Kincaid mound site, says Dr. Fay-Cooper Cole, University of Chicago anthropologist, who has been directing summer digging there. For eight years the university has worked at a 500-acre area, probing its buried history.

The half-dozen larger mounds were pyramids built by Indians carrying the clay in baskets, with a view to raising high places for ceremonies, explains Dr. Cole. On the flat tops they built temples of wood and thatch.

"Many people think that they must go to Egypt for pyramids or to the Near East for ruined cities, but we have both within the borders of this state," he points out.

Evidence that the Indians of the regions were farmers has been found. They raised corn and beans, but also depended on hunting and fishing. Fearing invaders, they built a palisade with bastions around their community. Still sought is their main burial ground, but single graves which look like stone coffins have come to light. The bodies were laid in the stone boxes formed by the large stone slabs.

More than 100,000 Indian relics, including quantities of pottery, have been recovered from the site, and are being studied at the university's anthropology laboratory. There is hope of detecting the exact time when the mounds were in use, by fitting pieces of wood from the site into a tree-ring calendar such as has been used in dating Indian settlements of the Southwest.

Science News Letter, November 8, 1941

DENTISTRY

Deaf Smith County, Texas, Points Way to Sound Teeth

Native Residents of County Aged From Two Years to Middle Age Have Not a Single Decayed Tooth

DEAF SMITH County, in the Texas "panhandle," may give the world a chemical formula for preventing tooth decay, it appears from preliminary studies reported by Dr. Edward Taylor, director of the dental division of the Texas State Department of Health, at the meeting of the American Dental Association in Houston.

The sound teeth of residents of that county so impressed a dentist in one of its towns, Hereford, that he suggested a study of local food and water intake might prove valuable.

Following this suggestion, the teeth of 43 native-born continuous-resident persons in and around Hereford, chosen at random by a teacher and an NYA worker who knew nothing of local conditions, were examined. Not a single decayed tooth or filling was found in the teeth of these people whose ages ranged from two years to past middle age, Dr. Taylor reported.

Equally if not more impressive was the finding that people who moved into the county from other states, with the usual number of cavities and fillings, after having lived there a few months ceased to develop further caries. Even a few cavities in the teeth brought there as much as five years previously with active decay had ceased to be active and the cavities had acquired hard, glazed floors and surfaces.

Tooth decay in Deaf Smith County, according to conclusions reached so far, is only about one half as much as the lowest amount heretofore reported in the United States and much lower than the average.

Deaf Smith County is part of a high level plain, the top soil a dark, sandy loam, below which there is clay containing a high percentage of calcium carbonate. Moreover, wheat ground in Hereford mills has a high protein content, and is about six times as high in phosphorus as the average standard flour. Milk samples at a local creamery contained 30% more phosphorus than accepted standards.

"This indicated that possibly all vegetables, dairy, and meat products of the area are comparably high in these elements so necessary to building and maintaining tooth tissue," said Dr. Taylor, who noted that every rural and many of the urban homes have one or more windmills, drawing water from a depth of 70 or 80 feet—water that has abundant fluorine and calcium.

Dr. Taylor declared his group believes a formula can be arrived at which will produce a high degree of immunity to tooth decay by the proper combination of fluorine, phosphorus, calcium, vitamin D, and possibly other factors in the food and water intake.

Science News Letter, November 8, 1941

Selectees Rehabilitated

ONLY encouraging factor in the high percentage of Selective Service rejections for dental defects "is that many dentally deficient registrants can be rehabilitated by proper dental service so that they can assume their military obligations," Dr. Wilfred H. Robinson, of Oakland, Calif., president of the American Dental Association, declared.

Dentists were not surprised that more than 20% of all men called for Selective Service were rejected for dental defects, Dr. Robinson said. Predictions of the Association's officers, based on facts in hand a month before the first draft number was called in 1940, were "borne out virtually to the last decimal point."

"Dental service must be made available to all groups of the population," Dr. Robinson declared. "Preventive dental care must be emphasized to prevent the tremendous accumulation of dental defects in the future. The coming generations must be kept free from the burden of neglected, accumulating and destructive dental disease."

Science News Letter, November 8, 1941

New Anesthetic

A RELATIVELY new anesthetic, pentothal sodium, has satisfactorily replaced "laughing gas" for putting patients to sleep when they are to have teeth drawn, Dr. Berto A. Olson, of Hollywood, Calif, reported to the American Dental Association.

Instead of having a mask put over his face and being told to "breathe deeply" of the sweetish gas, nitrous oxide, the patient gets the new anesthetic by a "shot" in the arm which puts the chemical into a vein.

"The recovery period is from 10 to 15 minutes without any symptom of sickness at the stomach," Dr. Olson said. During the operation, "the patient will open the mouth when told to, but later on will have no recollection of having done so."

Soup, tea or coffee is given the patient afterwards in the recovery room.

Results have been so satisfactory that pentothal sodium is now used for 90% of the patients. Nitrous oxide previously was used for 90%, Dr. Olson said.

Science News Letter, November 8, 1941

Why Dentures Look False

FALSE TEETH look false or like a "mouthful of teeth" largely because the cuspid teeth, where the teeth "turn the corner" are placed too near the center and are not made large enough, Dr. Irving R. Hardy, of New York, stated.

Use of acrylin resin in back teeth of store sets, he said, prevents the clicking sound which signals the fact that many a person is using false teeth.

Too many artificial teeth are flat, instead of being convex, and yield unnatural light reflections.

The deadly monotony of color can be varied, with a more natural appearance resulting, by some use of light mineral stains, especially for older people.

Science News Letter, November 8, 1941

Decay Theory Doubted

THE THEORY that tooth decay is related to the amount of calcium and phosphorus in the saliva "must be abandoned," Dr. W. W. Wainwright, of the University of California College of Dentistry, told the American Dental Association.

With some difficulty, Dr. Wainwright and associates found 90 persons with no decayed teeth whose saliva could be studied and compared with that from 108 persons with a large number of cavities. So far as the calcium and phosphorus contents of the saliva from the two groups was concerned, there was not enough difference to get worried about, Dr. Wainwright told the dentists.

Previous reports relating tooth decay to the amount of calcium and phosphorus in the saliva, he asserted, were based on examinations of too few persons to give a correct answer.

Science News Letter, November 8, 1941

For Infected Jaws

GOOD results with sulfathiazole treatment in 53 cases of infected jaws were reported by Dr. George C. Albright, of Greenville, South Carolina.

"In the short time sulfathiazole has been in existence, I am fully convinced that it is to play a major role in the treatment of jaw infections, especially the acute type infections—namely, the sore and infected lower third molar which is so prevalent, inflammation of the bone marrow in the upper and lower jaws, and in acute abscesses," Dr. Albright said.

He regularly applies the drug locally to sockets immediately after tooth extraction, and declared that in 300 cases healing was accompanied by less after-pain than in his previous experience.

Science News Letter, November 8, 1941

ZOOLOGY

Pink-Eyed Opossum Found in Oklahoma

A QUEER-LOOKING, ghost-like animal was seen up a tree near Cushing, Oklahoma. Captured, it was quickly recognized as being nothing but an albino opossum, half-grown. Its eyes were pink, with apparently no pupils. It was named "Pinkie."

"Pinkie" has won brief fame in *The Journal of Heredity* not because of its over-laundered, bleached-out appearance —albinism appears among many animals, from man to lobster — but on account of the nature of its coat, which is fine and lacks bristles.

The covering of the ordinary opossum is made up of a mixture of long bristle-like hairs and a fine under-fur. A. Lindsay, Oklahoma fur dealer, told Dorothy Mae Smith of the Oklahoma State College for Women, Chickasha, that the albino opossums he has handled never had any true fur at all: that it was all hair.

Albinism has an heredity basis in the opossum as in other vertebrates. True albinism is always a recessive. "Pinkie" is unique because of the hair-like condition of his fur. At any rate, it seems this feature of an albino opossum has never been noted before. That's why "Pinkie" gets into print.

Science News Letter, November 8, 1941

MEDICINE

Gray Hair Must Be Endured: Cure a TNT Ingredient

Para-Aminobenzoic Acid, Which Ordinarily Sold for A Few Dollars a Pound, Is Now Almost Unobtainable

AMONG trials that must be endured for the duration is gray hair.

Countless men and women are probably turning gray from worry and nervous stress in these days of national emergency. Maybe success in curing their gray hair would heighten morale, perhaps even lead to victory. Scientists have discovered a medicine, para-aminobenzoic acid, that cures the gray hair, but—

The medicine that blasts gray hair is made from the same stuff, toluene, that goes into TNT.

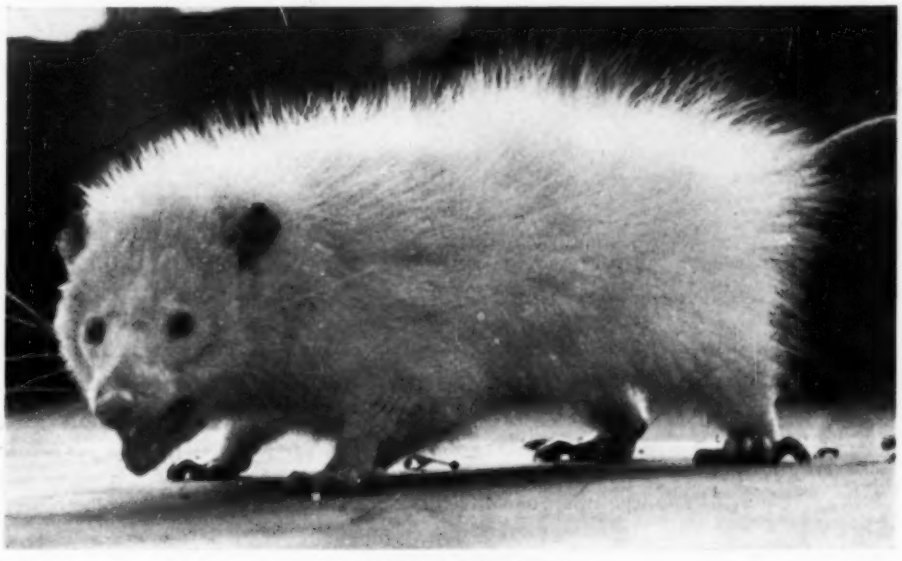
First questions asked when success of the gray hair cure was announced were: Where can you get the medicine? How much does it cost?

Experimenters at first believed that the chemical could be obtained for about 10 cents a pound. Digging for more exact information among the people who make it, not for medical use but for research and industrial purposes, it was learned that national defense has interfered with production and for the present the chemical is practically unobtainable, at any price, for the cure of gray hair.

Specifically, du Pont makes a technical grade of para-aminobenzoic acid, has sold it for $1.40 per pound in 150-pound barrels, but their production "is quite limited under present conditions; we have been unable to fill all of the orders offered to us by our regular customers and consequently are unable to currently make any new commitments on this product."

A purified grade of para-aminobenzoic acid for use in research and experimental work (the technical grade is used as an intermediate in dye manufacture) has been supplied by the Eastman Kodak Company at $8 for 500 grams (about one pound). Their present supply is exhausted, and they cannot make any more because the starting material, toluene, is needed for national defense. They believe the toluene shortage is temporary and, like du Pont, hope within a few months to be able to furnish the anti-gray hair chemical.

Science News Letter, November 8, 1941



UNIQUE ALBINO

This photograph from the Journal of Heredity shows a pink-eyed Albino opossum, unique because of his hair-like fur.

PSYCHIATRY

Vitamin B_1 Makes Insulin Shock Treatment Safer

Research By Pioneers in Field Show That "Protracted Shock" Can Be Predicted, Prevented or Even Produced

VITAMIN B_1 (thiamin) is now being used to make the insulin shock treatment for mental disease safer and more effective, it is reported by a California investigator and three physicians at Harlem Valley State Hospital, where this dramatic treatment was pioneered several years ago. (*American Journal of Psychiatry,* September)

By far the most dangerous complication which may occur in giving the insulin shock treatment is when the patient goes into a state of "protracted shock," failing to come out of it until damage to the brain has occurred or perhaps even death.

Yet when patients can be brought out of this dangerous state, it is sometimes found that they have been cured of their mental diseases.

Now it has been found possible to predict "protracted shock," prevent it, or even to produce it at will, it is reported by Dr. Jacob P. Frostig, of the University of California Medical School, and Drs. I. Murray Rossman, William B. Cline, Jr., and Oscar Schwoerer of Harlem Valley State Hospital.

So far no dependable methods have been found for terminating the condition once it has developed, so these physicians have made no use of their knowledge of how to produce it for therapeutic purposes.

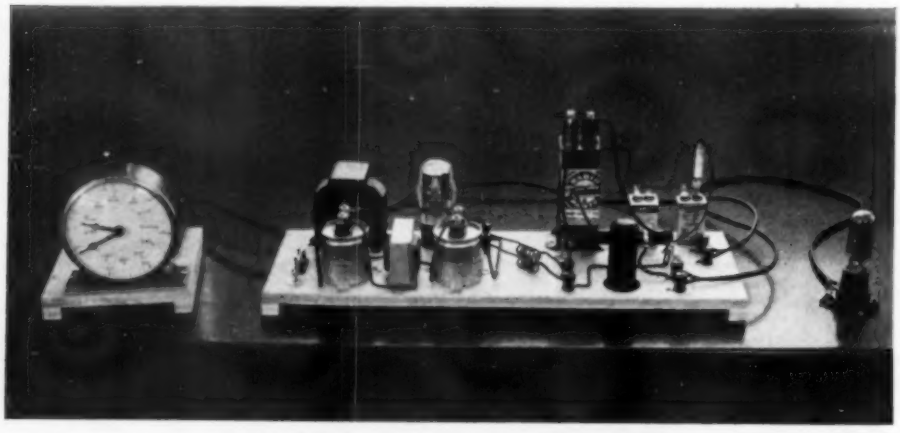
Insulin, when given in shock doses, follows a special course in its effects on the central nervous system. First, the cortex of the brain is affected, then the basal ganglia and hypothalamus, then the midbrain and finally the medulla oblongata. Various recognized symptoms accompany the successive involvement of these parts of the nervous system.

Study of cases of protracted shock revealed that this condition occurs only after the medulla oblongata has been involved for some time.

The dangerous protracted shock can be prevented, these physicians conclude, in three ways. The treatment can be terminated as soon as the signs of medullary involvement occur. If the symptoms should develop too rapidly to be prevented, the patient can be given an injection of glucose into the veins. In the case of patients who show a special tendency to the protracted shock, vitamin B_1 will prevent it if given regularly.

Even after protracted shock has developed, they found, injections of the vitamin in doses of from 3,000 to 10,000 units will shorten the period of unconsciousness.

Science News Letter, November 8, 1941



HOMEMADE SUNSHINE RECORDER

This complicated looking apparatus was made from an 89-cent alarm clock and from parts taken from a secondhand radio that was bought for $2. Including a few other items, the total cost was less than $15, plus the ingenuity of Drs. V. G. Sprague and E. M. Williams of Pennsylvania State College, who made it. It is a sunshine recorder. The clock is not used as a time-piece but as a counter. The balance wheel has been removed. The light falls on an electric eye producing a current which gradually charges a condenser. When the condenser is full, it discharges through an electromagnet which moves the escapement one tooth. Thus the clock counts up during the day the amount of sunshine that has been received.

AERONAUTICS

Parachutist Makes Record 30,000-Foot Leap

A VETERAN parachutist, Arthur H. Starnes, who has made more than 300 jumps from airplanes during the past 16 years, made the longest leap on record at an airport near Chicago, on Friday, Oct. 24. He dropped from a plane at the stratosphere altitude of more than 30,000 feet, and did not pull the ripcord of his parachute until he was less than 2,000 feet above the earth.

Self-recording instruments strapped to his body wrote their robot stories of his stone-like drop, for scientists to decipher after he came to earth. Mr. Starnes had his own story to tell of his sensations and experiences during his long fall. He says that his senses and mind function more rapidly and keenly than normal at such times; the old notion that a falling man becomes unconscious proves to be pure fable.

Combined instrumental readings and personal narrative will yield data to the scientists from the University of Chicago and Northwestern University who watched the performance from the ground. Some parts of the information are expected to be of importance from the national defense angle.

Within or upon the electrically heated flying suit, with specially constructed oxygen helmet, which Mr. Starnes wore, there were the following instruments:

A recording pneumograph, to tell how often and how deeply he breathed during the fall.

A special radio set that sent a record of his heartbeats to a receiving set at the flying field.

A barograph, which traced the story of his drop in terms of altitudes traversed.

An altimeter strapped to his wrist, to tell when to pull the cord.

An automatically started stopwatch, to time the fall.

A motor-driven motion picture cam-

era, which showed number and direction of spins and tumbles, as it alternately photographed clouds and earth.

A small voice radio set within his helmet.

Military advantages of a delayed-opening drop from high altitude, Mr. Starnes points out, include (first of all) getting away from the enemy fighter quickly, rapid descent into air levels where temperature and oxygen supply are not too low for consciousness and hence life, and lowered risk of being struck by one's own wrecked plane or its parts. If aviators can be convinced that long drops make for greater safety, he feels, combat tactics may be materially affected.

Science News Letter, November 8, 1941

VETERINARY MEDICINE

New One-Dose Vaccine Frees Hogs From Cholera

Discovery Expected To Do as Much for Hog Health As Smallpox Vaccine Has Done for Human Welfare

A DISCOVERY that will do as much for hog-health as smallpox vaccine did for humans has just received the final OK of practical farmers. For over a hundred years hog cholera has been causing greater losses in the United States than have all the other live stock diseases combined. The best answer to the problem was the serum-virus treatments, but that preventive sometimes proved worse than the disease.

Prof. William T. Boynton, professor of veterinary science at the University of California, has been working on this problem since 1917, and has finally developed a vaccine which not only gives wider, longer-lasting immunization from hog cholera but eliminates the serious drawbacks of the former serum-virus treatment.

The serum formerly used was so susceptible to deterioration from a number of causes that it was sometimes impotent when administered. Dr. Boynton's vaccine, subjected to rigid exposure tests, remained stable and effective under all circumstances.

Serum-virus inoculations were often fatal to under-condition animals, and sometimes led to a flare-up of enteritis, pneumonia, and verminous infection. The new vaccine has no adverse effects on health.

During the serum-virus inoculations growing animals were "off their feed" and had general vitality lowered so that growth was stunted temporarily. The new vaccine does not diminish the young animal's voracious appetite and hogs immunized with vaccine are ready for market two to six weeks ahead of those immunized with serum and virus.

There is no danger of spreading the very infection which it aims to control by re-seeding the premises with the virus as the old treatment sometimes did, for the vaccine is not made from the blood of once-infected animals, but from a finely ground glandular tissue which, treated with eucalyptol, has lost its disease producing properties and yet keeps its immunizing ability.

Proved not only in the laboratory but in actual farm tests, where over 100,000 pigs have been successfully immunized on hundreds of Western and Corn Belt farms, the vaccine is well established now. Treated animals transferred to untreated farms remain healthy in the midst of a hog cholera epidemic.

It was believed at first that two injections of the vaccine were necessary to keep pigs cholera-free between weaning and maturity. It has just been announced, however, that recent tests have shown a single inoculation sufficient for immunization until pigs reach marketing age.

Science News Letter, November 8, 1941

ASTRONOMY

Volunteer Star Watchers Record Changing Starlight

SOME 850,000 observations of about 600 stars have been made in the past 30 years by members of American Association of Variable Star Observers, Leon Campbell, recorder, reported in his annual summary of the researches of this band of volunteer astronomers scattered all over the world.

Veteran watcher of the fluctuating light of these stars is Rev. T. C. H. Bouton, who has observed during the whole 30 years of the existence of the association, first from Hudson, N. H., and now from St. Petersburg, Fla. At the age of 85, he is still adding to his grand total of 25,000 observations.

L. C. Peltier of Delphos, Ohio, known for his comet discoveries, has been observing steadily since 1918 and has nearly 60,000 observations to his credit.

E. H. Jones of Goffstown, N. H., has been keeping track of variables since 1923 and has a total of 40,000. J. M. Baldwin of Melbourne, Australia, has made nearly 35,000 observations since 1920 and R. G. Chandra, of Bagchar, India, follows with 29,000 estimates made during the past 21 years.

The volunteer astronomers banded together in the A.A.V.S.O., sponsored by Harvard Observatory, spend most of their effort keeping an estimating eye upon the fickle stars that are inconstant in their light. Small telescopes are used for this purpose and there is plenty of room in the sky for additional observers who will have special stars assigned to them as they prove their competency.

The amateurs also watch and compute occultations of the moon and search for bright, suddenly appearing novae or "new stars."

In the past year 38,043 observations of variable stars were made, with Cyrus F. Fernald of Wilton, Me., first with 3,133 observations.

Science News Letter, November 8, 1941

PHYSICS

Ozone Odor Detected During Auroral Display

THE ODOR of ozone was reported by several persons in the vicinity of Radburn, N. J., during the great auroral display of Sept. 18.

This unmistakable odor was noted by Prof. Malcolm E. Little, anatomist of New York University's School of Education, who has transmitted his observations to scientists specializing in such phenomena. The sensation was strongest when the auroral display was at its height, entering at the zenith with coronal light and spreading toward the horizon in sheets. Odors have been reported occasionally from earlier displays.

Some of his neighbors also detected the ozone, asking him:

"Can you tell me what the peculiar odor is?"

"Is it my imagination, or is there a sharp odor in the air?"

"Both my wife and I detect the same odor that one gets near a dynamo. Do you know the explanation?"

Science News Letter, November 8, 1941

PHYSICS

Why an Acoustic Mine Explodes

This Is How You Can Make a Working Model

By JOSEPH H. KRAUS

Science Clubs of America Editor

The acoustic mine, a new form of weapon which is set off by the sound of beating propellers of ships, is reported in use by Germany. Any vessel unfortunate enough to come within range of its electrical ears is doomed for destruction.

The common mine is studded with fingers which project from the explosive sphere. To set off the charge, the ship's hull must brush against the mine itself. This prerequisite demands that these charges be located only a relatively short distance beneath the surface of the water because the ship actually must strike the mine to explode it.

Because ordinary mines did not cut savagely enough into England's vitally important shipping arteries, Germany attempted to make her blockade of England more effective with a mysterious magnetic mine. This mine was planted at a depth considerably below the depth of a ship's hull. The submerged explosive device contained a delicately mounted magnetic needle. The metal of a passing ship disturbed the position of the needle and closed an electrical circuit to the detonator which, in turn, exploded the charge.

Newspapers headlined the story of this mystery weapon. But scientists soon found a method for making the magnetic mine harmless. Protective devices were promptly installed on ocean-going vessels. Merely running alternating current through a bundle of wires encircling the ship was sufficient to offset the "drawing" properties of the metal parts of the vessel.

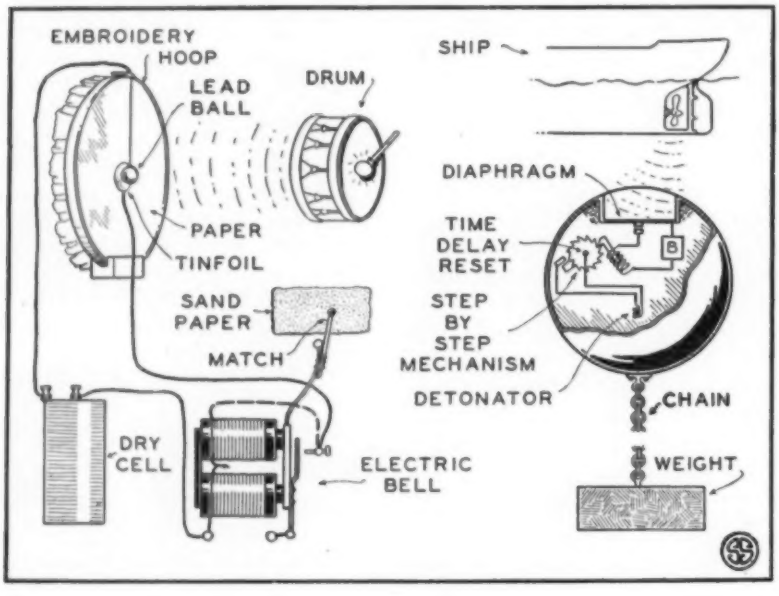
But will the answer to the acoustic mine be found with the same speed? Perhaps some of the readers of this department will be able to work out a satisfactory solution.

While details of the acoustic mine are lacking at the present time, it seems likely that this weapon will be arranged in a manner similar to that illustrated diagrammatically on this page. The acoustic mine must have some sort of a diaphragm which will be set into vibration by the sound produced by throbbing engines or beating propellers.

Naturally, a dull thud resulting from an explosion or a series of explosions also would cause such a diaphragm to vibrate, and explode the mine. Consequently, a device that will respond only to a succession of impulses, like those of an engine or propeller, can be permitted to explode the charge. To insure such selective action, a step by step mechanism may be used. If the beats are not continued for a sufficient time, the cogwheel of the time delay reset would return to its starting position, and the mine would not explode.

This kind of mechanism is found in the automatic SOS alarm which needs no operator, yet stands guard day and night and rings a loud gong whenever an SOS call is picked up by a ship at sea.

An interesting laboratory demonstration of an acoustic mine can be made with a few simple bits of equipment. A sheet of writing paper is moistened and then stretched across an embroidery hoop where it is allowed to dry. This produces an excellent drum-like surface. To the center of this a small piece of tinfoil is cemented with ordinary library paste. A paper clip is pushed into the top of the embroidery hoop and from this is suspended a very fine wire (a single strand from a bared lamp cord) to the bottom of which is affixed a lead button. A similar very thin bare wire is attached to the tinfoil at the center of the diaphragm. A piece of bell wire is now connected to the paper clip and to one side of an ordinary dry cell. The other side of the dry cell connects by wire with one post of an electric bell. Examine the electric bell to find the connection between one end of the electro-magnet (the coils in the bell) to the contact screw or interrupter. This is illustrated by the dashed line in the diagram and this connection need not be made. It is included in this diagram so that the experimenter can trace the circuit. However, a piece of bared wire should be twisted around the contact screw and should run from that point to the tinfoil attached to the middle of the drum. To add vividness to the demonstration, a wooden safety match is attached with a rubber band to the clapper of the bell. The specially treated striking surface from the match box is so arranged that the head of the match presses against it. This striking surface is marked "sandpaper" in the diagram.



We are now ready for the demonstration. Stand the embroidery hoop in a vertical position on a suitable support and adjust the lead ball so that it barely makes contact with the tinfoil. When this is done correctly we can press the armature (that part of the bell to which the clapper is attached) against the pole pieces of the electromagnet. We then produce the situation shown in the diagram. Talking, whistling or singing will have no effect on the apparatus but if a low note is struck, as for example the sound produced by beating a drum, in imitation of the noise made by beating propellers, the diaphragm of the hoop will vibrate. At this moment the lead ball will bounce away from its point of contact with the tinfoil and the electrical circuit will be broken suddenly. When this happens the bell clapper will be released and the match will scrape across the striking surface and be ignited.

By this method we are able to visualize how an acoustic mine works. If we care to experiment further, we should attempt to develop something at the sound-producing end to prevent the diaphragm from setting into motion the mechanism of destruction. That then would be an answer to the acoustic mine.

E OBSERVER

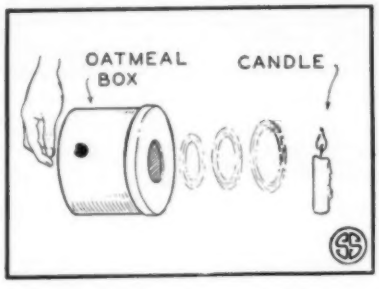
Am Sponsored by Science Service

PHYSICS

Vortex Rings Produce Mysterious Effects

Smokers often are seen to amuse themselves by blowing rings. But smoke is not a requirement of a vortex ring—the technical name by which a smoke ring is known. Other similar vortex rings are produced in liquids and may be seen by dropping water, tinted with ink, into a glass of clear water. (Locate dropper one inch above water surface for best results.)

A great deal of amusement can be derived from the arrangement illustrated



in the diagram. An ordinary oatmeal box is cut to a length of about three inches. A perfectly round hole is cut in the center of the cover. The proportion of this should be approximately as shown in the diagram. No dimensions are needed here. At a distance of several feet from the oatmeal box, set up a lighted candle, then tap the bottom of the box sharply. Invisible vortex rings will be driven out of the box with considerable force and will "blow out" the candle flame. To see the results, ask someone to blow a mouthful of smoke into the oatmeal box (or the smoke can be produced chemically as will be described in a future article). The perfect rings will be made evident now. Tap the box lightly and produce a slow moving ring, then hit it sharply and produce a fast moving ring and observe what happens when one ring passes through the other. Try to produce rings at three different speeds. Also observe the effect when one ring strikes the edge or crosses another. This is accomplished by shifting the box slightly to one side.

Science News Letter, November 8, 1941

"Wine" Into Water

Phenolphthalein is a rather popular chemical indicator, that is, it possesses the property of changing its color when acted upon by certain alkalis.

From your drug store procure 5 or 10 cents worth of phenolphthalein and dissolve as much as will fit on the point of a knife in a little pure grain alcohol Stir this solution into a pitcher of water. Arrange three glasses on the table. The first glass remains empty. In a teaspoonful of water dissolve as much bicarbonate of soda as you can. This is put in the bottom of the second glass. Into the third glass pour a teaspoonful of lemon juice.

Pour the water from the pitcher into the first glass, then into the glass containing the bicarbonate of soda. The water will not change in the first glass but will become pinkish in the second. Return the contents of both glasses to the pitcher, stir, and the contents of the pitcher will now appear colored. Fill the first two glasses again with the colored water and then pour some into the third glass containing the lemon juice. A slight amount of gas (carbon dioxide) will be produced and the solution will clear rapidly. Return the contents of all three glasses to the pitcher and the water in the pitcher will once again become clear.

Science News Letter, November 8, 1941

NEWS OF CLUBS

SAN GERMAN, P. R.—"Explorers of the Unknown" is the name of a new science club at the San German High School. Sponsored by J. Nagario de Martin, chemistry teacher, this group puts realism in its projects by collecting money for the purchase of needed classroom material.

SYRACUSE—The Physical Science Club of Grant Junior High School, sponsored by D. H. Ackerman, held a Science Exhibit on November 4 and 5. The club uses an interesting study plan, with a different committee presenting a program at each meeting.

CHESTERTOWN, Md.—The Garnett High School Science Club, sponsored by Olin T. T. Thompson, is experimenting in the growth of plants without soil and is developing exhibits for a Science Fair.

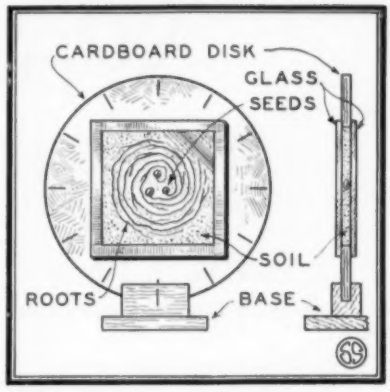
DELAND, Fla.—Members of Kappa Pi Kappa, sponsored by Miss Alice Van Cleef, will hold a fingerprinting campaign for students of DeLand Senior High School. Members, now sporting the new Science Clubs of America pin, have worked out an extensive program that will include lectures, demonstrations, experiments and field trips to industrial organizations.

PITTSBURGH—Members of the Biology Club of Peabody High School are making field collections for microscopic work and are building up their file of plants and leaves. Under the sponsorship of Miss Marie Knauz, the club has been able to arrange talks by members of the Audubon Society and the State Game Commission.

LAWRENCE, Kans.—Building airplanes, making radios and conducting experiments with dyes and bacterial cultures are in the program of the Junior Academy of Science Club at Lawrence Junior High School. Under the sponsorship of Miss Edith Beach, members are working up an exhibit for the yearly state meeting. The club has been in existence since 1930 and is affiliated with the Kansas Junior Academy of Science.

WELLSVILLE, Mo.—Demonstrations in physics, biology and chemistry are being made by members of the Bi-Phy-Chem Club of Wellsville High School, sponsored by Miss Gertha Stark. The club is affiliated with the Missouri Academy of Science.

Clubs are invited to become affiliated with SCA for a nominal $2 for 20 members or less. You can become an associate of SCA for 25 cents, which includes a copy of the 128-page Science Handbook for 1942. Address: Science Clubs of America, 1719 N St., N.W., Washington, D. C.



BOTANY

Roots of Plants Always Grow Downward

No doubt, you have wondered why it is that the roots of plants always tend to grow downward toward the soil. Just what it is that causes this to happen is still unknown. Scientists call it geotropism. The demonstration of this phenomenon is much more simple than an explanation of its cause.

Cut a large disc from heavy cardboard and in this make a window against which to fit two photographic plates. (The local photographer will be very glad to furnish some of his old plates which may be stripped of their emulsion by soaking in hot water and scraping with a knife. Any other piece of glass four inches square or larger can be used.) Attach one of the glass plates to the back of the disc, using Scotch or adhesive tape for this purpose. Fill the window with good moist soil, introduce three bean seeds and then add the second plate of glass, again attaching this with tape. Set this arrangement on a table in a suitable holder and, if you desire, mark the cardboard disc as illustrated.

As soon as the beans begin to sprout turn the disc every day to the next marking.

The tendency of the roots to grow downward; that is geotropism, is beautifully illustrated by this exhibit which will show a concentric spiral of root fibers. This is a unique demonstration well worth the amount of time and labor involved in setting it up.

Science News Letter, November 8, 1941

SCIENCE CLUBS OF AMERICA

SCA, under Science Servce sponsorship, continues the pioneering activities of the American Institute of City of New York over the past 15 years and the Student Science Clubs of America which was merged with that movement. The American Institute continues to foster the regional activities of the junior clubs of the New York City area as a science center.

To effect close cooperation between the American Institute and Science Service, an advisory committee on SCA is being formed.

The principal SCA staff consists of Joseph H. Kraus, SCA editor, and Margaret E. Patterson, SCA membership secretary, based at New York in offices at 310 Fifth Avenue, also occupied by the Amercan Institute, H. D. Lufkin in charge, and its Science Laboratory, Henry Platt directing.

PUBLIC HEALTH

Winged Threat to China

Mosquito Carrying Deadly Malaria Is Real Threat To Burma Road; Lend-Lease Aid in Form of Medicines

By DR. VICTOR H. HAAS

Chief, American Medical Commission to China

IN THE steaming valleys of Yunnan, Chinese province on the Burma border, a 16-man Lease-Lend mission of American public health specialists, equipped with pills, Paris green, kerosene and spray pumps, are fighting to protect China's lifeline from an aerial foe more effective than Japanese bombs.

That foe is malaria, killer of millions, thief of energy that cripples more millions, making them unable to carry on the vital job of building a new Burma road of steel rails for swift transportation of supplies to beleaguered China.

The Medical Commission to China was appointed in August by Surgeon General Thomas Parran of the United States Public Health Service at the request of the Chinese government, with the approval of the State Department. The responsibility of the commission is to control malaria and to supervise sanitation and medical care among 250,000 Chinese workers who are building a railroad near the Burma highway.

Only Open Road In

The Burma highway is China's only open road to the outside world. Despite the recent accomplishments of American traffic experts under the leadership of Mr. David Arnstein, that one slender line is not enough to keep supplies flowing inland to China's armies.

The new railroad is being rushed to completion to relieve this congestion. It will begin in Lashio, starting point of the Burma highway, and will continue through Yunnan Province by a different route, rejoining the Burma road at Kunming.

Yunnan is a land of desolate hills and steaming valleys, with few towns or villages. Hundreds of miles of the lonely new right-of-way run through one of the world's most heavily infested "malaria" areas. Along the way 250,000 workers will live in "railroad camps," where safe drinking water, sanitary facilities and medical services must be provided. And every day the commission must fight malaria.

More than any other disease malaria sabotages vital engineering projects in tropical areas. The Panama Canal might never have been completed had not American physicians, engineers and sanitarians been able to protect the workmen from malaria and yellow fever, another mosquito-borne disease. Malaria saps energy and slows up work. It takes the laborer off the job for days at a time. Malaria, in its virulent form, often causes death. Even with China's teeming population to draw from, it takes time to replace good workers. And China hopes to complete the new railroad in 15 months. It is the commission's job to see that no time is lost to malaria.

Two Effective Methods

There are two effective methods of fighting malaria. One is to fight the mosquito; the other is to give the 250,000 patients the drugs that will fight malaria in their bodies. The two effective drugs are quinine and atabrine.

The Chinese government is providing physicians, nurses, sanitary engineers and 800 laborers to assist us. The expenses of the commission, including more than a million dollars worth of medical and other supplies, will be provided by the United States under the terms of the Lease-Lend Act. Supplies and equipment will be procured by China Defense Supplies, Inc., and will be shipped to the site of operation.

At the start of operations about the first of November, the commission has on hand 10 million tablets of quinine, two million tablets of atabrine and an ample supply of Paris green, kerosene, spray pumps, and other anti-mosquito supplies. It will not be as difficult for us to get quinine as it is now to get it in the United States, since quinine will come to us direct from Java. Atabrine will come from the United States. Later, probably by mid-winter, we will get 25 million more tablets of quinine and two million more of atabrine.

In the district where the commission will be working malaria is carried by the *Anopheles minimus*, a mosquito with a flight range of only one-half mile. The American malaria mosquito is another of the *Anopheles* family — *Anopheles quadrimaculatus*—whose flight range is one mile. So in Yunnan we shall have to fight the mosquito in a smaller area surrounding the railroad workers than would be the case in this country.

Workers Will Move

As construction progresses, the mass of workers and our base of operations will move forward, too. For this reason, it will not be necessary to undertake extensive drainage of mosquito breeding places. Drainage is a more permanent method of mosquito control than we shall need. Instead, we shall spray water courses and pools where *Anopheles minimus* breeds with Paris green or with pyricide 20 diluted with kerosene. Adult mosquitoes will be killed in living quarters with pyrethrum sprays. Mosquito-control work will require at least 50 tons of Paris green, 200 gallons of pyricide 20, and 4,000 gallons of kerosene.

Every person employed on the railroad project and in the commission's work will be given anti-malarial drugs. The preventive dosage is based upon the best medical opinion in the United States with reference to tropical diseases. Either a five-grain quinine tablet is given every day, or two tablets, each containing one-tenth gram of atabrine, are given twice a week. These drugs attack the malaria

THE VILLAIN

This is a malaria-carrying mosquito.

WATCHFUL

These Chinese children are being examined to see whether they have enlarged spleens which are a sign of malaria infection.

parasites in the blood stream and prevent them from living out their life cycle, in the course of which the victim would suffer an attack of "chills and fever."

Providing good sanitation and medical care for the workers will also be supervised by the commission. The Burma-Yunnan Railway is responsible for medical service, but this work will be under the direction of an experienced medical officer, Dr. Fred P. Manget, who is a member of the commission. Dr. Manget has spent 32 years of his life in China as superintendent of an American mission hospital.

Women Do Heavy Work, Too

According to Mr. C. Y. Tu, managing director and chief engineer of the railroad, the commission's patient population will include both men and women. In China, both sexes are doing the same kinds of heavy work and we shall probably have as many women patients as men.

Dr. Marshall Balfour, chief of the Rockefeller Foundation's Far Eastern Division, will act as consultant and adviser to the Medical Commission. His headquarters are at Manila, and from there he will join us.

Besides Dr. Balfour, Dr. Manget and myself, the members of the commission include: Dr. T. H. Tomlinson, U. S. Public Health Service, in charge of malaria control; Dr. Paul Stephenson, formerly of Peiping Union Medical College, in charge of public health and sanitation; Dr. Gordon Smith and Dr. W. L. Jellison, Public Health Service; Mr. H. A. Johnson, Public Health Service; Mr. Frank W. Fisk, University of California; Mr. D. E. Wright, Rockefeller Foundation; Mr. F. W. Thomas and Mr. E. R. Lacy, Tennessee Valley Authority; Mr. L. B. Hall, Georgia State Department of Health; and Mr. Arthur B. Morrill, Detroit, Mich., Water Board. The clerical staff, Mr. Carl Gohman and Mr. Joseph Pasterski, is also from the Public Health Service.

It is expected that the Medical Commission to China will be on the job for at least a year. By December, we expect to be fighting malaria along the Burma-Yunnan Railway.

Science News Letter, November 8, 1941

MEDICINE

Chemicals From Germs Better Than Sulfa Drugs

TWO NEW bacterial substances may prove beneficial in treating sinus infection, mastoid infections, empyema, boils, infected wounds, and other localized bacterial infections, Dr. W. Barry Wood, Jr., associate in medicine and associate physician at the Johns Hopkins Hospital of Baltimore, reported.

Speaking at the annual meeting of the Eighth District branch of the Medical Society of the State of New York, Dr. Wood discussed the clinical use of the sulfonamide group of drugs and pointed out that these two new substances have certain theoretical advantages over sulanilamide and its derivatives.

"These drugs, use of which is only in the experimental stage, kill gram-positive bacteria and will do so in the presence of pus," he asserted. The action of sulfanilamide and its derivatives, on the other hand, is greatly inhibited by the presence of pus.

"These substances, both of which are products of other bacteria, may be of benefit particularly in treating bacterial infections encountered in surgery."

The substances are gramicidin, developed by Dr. Rene Dubos of the Rockefeller Institute and penicillin, discovered in England. Experiments with these substances are now being carried out both in this country and in England.

Science News Letter, November 8, 1941

MEDICINE

Pyorrhea May Come From Thyroid Gland Disorder

THYROID gland disorder, especially deficient thyroid action, may be the cause of some cases of pyorrhea, Dr. Rowe Smith, of Texarkana, Ark.-Tex., stated at the meeting of the American Dental Association in Houston.

Secondary anemia was also a factor in a number of patients he studied.

Pyorrhea is curable and preventable, Dr. Samuel Charles Miller, of New York, asserted at the same meeting.

Causes of the condition both in the mouth and elsewhere in the body should be sought and corrected, both dentists emphasized, pointing out that attention to the mouth alone may have been responsible for many failures in pyorrhea treatment in the past.

Science News Letter, November 8, 1941

● RADIO

Thursday, November 13, 3:45 p.m., EST

On "Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Frank B. Jewett, president of the National Academy of Sciences, will discuss the relation of industry to fundamental research.

Listen in each Thursday.

Monday, November 17, 9:30 p.m., EST

Science Clubs of America program over WRUL, Boston, on 6.04 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in high schools, throughout the Americas. Have your science group listen in at this time.

ANTHROPOLOGY

How Big Are American Feet? Scientists May Find Out

Shoe Sizes Have No Exact Meaning, Government Experts Have Found; They Do Not Reveal Variations in Contour

HOW BIG are American feet? And what shapes? Nobody knows. Extensive measurements have never been made.

But measuring thousands of American feet will be undertaken, so that fitting shoes can become a science, not an art, if a new report by the U. S. Bureau of Home Economics leads to action.

In the report just issued on "Shoe Sizing and Fitting," Mrs. Carol Willis Moffett, collaborator of the Bureau, says that the Bureau is now doing research on new methods of measuring feet, taking into account curves as well as simple length and width. The Bureau's big job of measuring 150,000 American children and 15,000 American women, to make sizing of clothing more scientific, showed that getting a broad cross-section of scientific data on what American people are like physically can be accomplished. Manufacturers are beginning to put the facts and figures to use.

The report calls to public attention such facts about feet and shoes as these:

It is possible to put the same adult foot into any one of six sizes of shoe, although one of these will be a better fit.

There is no agreement among retailers as to whether customers' feet should be measured with weight on or off the foot, though it may make considerable difference in foot size.

Blind size markings, used by many manufacturers and retailers, have helped to conceal from consumers the confused practices in sizing and fitting. More than 160 codes are used today to indicate size.

A broad shoe is made longer than a narrow one of the same size to give a more streamlined look. Thus, says Mrs. Moffett, a 7A will be shorter by one-sixth of an inch or more than a 7E.

Most consumers think that widths stated in letters such as A, B, C are the width at the sole of the foot. In fact, they represent girth measurements at the ball, waist and instep of the foot. Last manufacturers may vary these measurements, adding a sixteenth of an inch or more to one girth and taking it from another, in efforts to produce a better fitting last.

"Shoe sizes have no exact meaning today," adds the report, "because they do not reveal important variations in dimensions and contour."

Everybody knows what a foot looks like, but no one has ever precisely defined what a foot is in size, shape and rate of growth or change, although this is needed for mass production of an article of clothing that is as unalterable to suit individual variations as shoes are, says Mrs. Moffett.

Science News Letter, November 8, 1941

METALLURGY

Lead-Tin Alloy Softens As It Grows Older

ALLOYS that harden with age have often been observed. But an alloy that softens as it grows old is something really new under the sun. Such an alloy was discovered four years ago by Prof. H. Vance White, head of the metallurgy department of the Virginia Polytechnic Institute, in lead alloyed with a small quantity of tin.

To discover the cause, an X-ray study of this substance has now been made by Miss Bertha H. Weaver, graduate student.

The X-rays showed the characteristic pattern or "lattice" of crystalline lead, but with here and there an atom of tin substituted for an atom of lead. This meant that the tin was dissolved in the lead, forming a "solid solution" of tin in lead.

Examination with the spectroscope, the instrument which by analysis of light tells what things are made of, showed at first no "lines" of tin. Later these lines developed, showing that the tin was being slowly precipitated from the lead lattice.

Curiously, this is exactly the same thing that happens with alloys that harden with age. How could the same process account for both hardening and softening?

It had been supposed that the loosened particles got in between the slip planes of the crystals, thereby creating friction which impeded their slipping one over the other, like sand between the sliding parts of machinery. The hardness of alloy steels is explained in this way.

Miss Weaver suggests that in the lead-tin alloy the precipitation had already begun while the mixture was still molten and that the critical size of particle for maximum friction had been surpassed by the time the alloy was solid. As the particles further increased in size they began to act more like ball bearings than like sand or gravel, and promoted instead of impeding the slipping. Thus the alloy became softer.

Science News Letter, November 8, 1941

MEDICINE

Sulfathiazole Successful In Treating Dysentery

SUCCESS with sulfathiazole treatment of bacillary dysentery is reported by Dr. Merlin L. Cooper, Dr. Ralph L. Zucker and Dr. Stewart Wagoner, of the University of Cincinnati College of Medicine and the Children's Hospital Research Foundation (*Journal, American Medical Association,* Nov. 1).

Their patients were babies and small children. The treatment succeeded only when the dysentery was caused by the germ known as Shigella paradysenteriae. Other cases of dysentery, such as have frequently been epidemic in hospital nurseries in recent years, were not affected by the sulfathiazole treatment. The dysentery that was successfully treated, however, is the type especially prevalent in tropical countries.

The little patients who received the sulfathiazole treatment recovered much faster than those not getting the drug for bacillary dysentery. All but one of the 17 stopped discharging the germs by the time they left the hospital, whereas 17 of 34 patients who did not get sulfathiazole were still discharging germs at the time of leaving the hospital.

Science News Letter, November 8, 1941

ASTRONOMY

Sun Is Just a Youngster Two Billion Years Old

Sun Lives, Scientist Says, By Alchemic Conversion Of Hydrogen into Helium; Has Ten Billion Years Ahead

THAT the sun is just a youngster, only two billion years old, and will probably live to the age of twelve billion, is the opinion expressed by Dr. George Gamow, professor of physics at George Washington University, in an interview during the General Electric Science Forum program broadcast from Schenectady, N. Y.

"Probably the best proof," Dr. Gamow said, "of the view that the entire stellar world had a definite beginning in some distant past can be found in the observations of Dr. Hubble of Mount Wilson Observatory. His results indicate that the large stellar groups, known as island universes, and similar in their nature to our stellar system or Milky Way, are receding from each other at a rather high speed. From the observed velocity of the recession, one can easily calculate that the separation of these giant stellar clouds must have taken place only about two billion years ago." At some period before that time, the matter of the stars formed one continuous mass of hot gas. "The epoch when this primitive gaseous chaos was broken up by the process of progressive expansion into the separate stars can be truly considered as the period of the physical creation of the world."

"In particular, the formation of our earth, which, according to geological data, is just about two billion years old, also falls within the same period."

Dr. Gamow rejected the hypothesis that the distances between the stars had always been substantially what they are now and that the earth and the other planets had been formed in a violent collision between our sun and some other star. Calculations show, he said, that in such an event it is extremely improbable that more than one collision could have occurred during the entire past of stellar existence. If, on the other hand, the stars two billion years ago were very close together, collisions should have been frequent, and suns accompanied with planets should now be the rule rather than a most extraordinary exception.

The sun lives, Dr. Gamow declared, by the alchemic conversion of hydrogen into helium. This is the source of its light and heat which it expends so lavishly. It is atomic power on the grand scale—which we on earth have only succeeded in imitating microscopically. It is the same with the other stars.

Since hydrogen is the fuel of the stars, their probable life spans can be predicted on the basis of how much they have on hand and how fast they are expending it.

Our sun is now about 35% hydrogen, and at the present rate of consumption, Dr. Gamow stated, this will last for another ten billion years.

Science News Letter, November 8, 1941

MEDICINE

Gland Removal Aids Muscle Weakness Disease

Besides Offering More Permanent Relief for Patients, Operation Throws New Light on the Thymus Gland

ENCOURAGING results in treating the muscle weakness disease, myasthenia gravis, by surgical removal of the thymus gland in the chest are reported by Dr. Alfred Blalock, Dr. A. McGehee Harvey, Dr. Frank R. Ford and Dr. Joseph L. Lilienthal, Jr., of the Johns Hopkins Medical School and Hospital (*Journal, American Medical Association,* Nov. 1).

Out of six patients on whom the operation was performed, one died. Dramatic improvement in strength continues in three, operated on in July and August of this year, and these patients are getting along without any medicine. Improvement in the other two patients so far is less striking.

Besides offering hope of more permanent relief than medical treatment for these patients, whose muscle weakness often progresses to the point where they cannot swallow and breathing is a tremendous effort, the results of the operation throw new light on the little understood thymus gland. They suggest that the thymus, which usually shrinks in size as the body grows, is a gland producing an internal secretion, as do the thyroid and other endocrine glands of the body, and that it may have a definite function to perform.

Myasthenia gravis, the Hopkins scientists point out, presents in some ways a picture similar to that of curare poisoning. This suggested that some tissue in the body of these patients might be producing a substance similar to curare, the chemical which was once used as an arrow poison by the Indians.

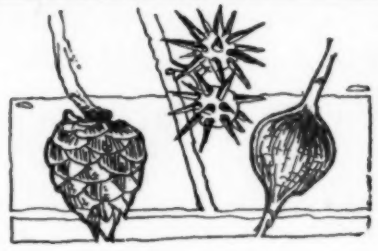
The thymus gland came under suspicion because about half the reports of post mortem examination of myasthenia gravis patients showed tumors, enlargement or persistence of the thymus gland and because in one patient removal of a tumor of the gland was followed by complete recovery of the patient who has remained well for four years.

Science News Letter, November 8, 1941

Cotton-padded tarpaulins for *bee hives* are found effective comforters for cold weather, and durability tests are being made.

PLANT PATHOLOGY

NATURE RAMBLINGS by Frank Thone



Plant Defenses

PLANTS defend themselves against attacks of enemies by a wide variety of devices, some of which are described in a recent symposium book. In many cases what we commonly describe as the disease really consists of the defense mechanisms operated by the plant against the real disease (*Reviewed, SNL, this issue*).

Gray, cork-rimmed holes in leaves of cherry trees are referred to as shot-hole disease. Actually, Dr. F. W. Went of the California Institute of Technology points out, they are signs of the plant's successful defense against the invading fungus. It has walled it off with a layer of cork that has prevented further spread, and permitted the tissue already killed to slough away. The whole performance is to some extent analogous to the encystment of parasites in animals, or the formation of the enveloping limy wall around a knot of tubercle bacilli.

The formation of cork is a very general type of defense in plants. Cork in trunk bark is a natural, normal growth, but the cork that forms around wounds develops only through the action of a hormone, present apparently in all living cells but released for duty only when the cells are destroyed. Again taking a somewhat remote animal analogy, it is a little like the emergency reaction of blood clotting.

Tumor-like swellings and other outgrowths, like witches'-brooms on some kinds of trees, are usually reactions to injury or attack by some outside organism. Sometimes, as in the case of plant galls produced by the thrusting of insects' eggs into the twig tissues, they benefit the parasite by producing an abundant and rich food supply for the larvae. In other cases, as in the bacterial disease known as crown gall, the plant tumors yield no known benefits to the invader.

Plants are even able to make the attacker serve them, it is pointed out by the writer of another chapter in the book, Dr. W. C. Price of the Rockefeller Institute for Medical Research. Numerous researches by various investigators have shown that if a plant is invaded by a certain virus disease, like tobacco ringspot, and recovers from the attack, the virus remains in the plant in more or less attenuated form, and that as long as it is present the viruses of related diseases are unable to gain a foothold. It sounds a little like the time-honored inoculation procedure of Jenner, in which cowpox voluntarily contracted conferred immunity against smallpox.

Science News Letter, November 8, 1941

MEDICINE

Synthetic Sex Hormone Now Safe For General Use

PRESENT restrictions on the general medical use of the synthetic female sex hormone, diethylstilbestrol, should be removed, now that two and one-half years of careful tests show the synthetic hormone is both safe and effective, four St. Louis physicians advise (*Journal, American Medical Association,* Oct. 11). The physicians are: Dr. Cyril M. MacBryde, Dr. Dante Castrodale, Dr. Ellen Loeffel and Dr. Harold Freedman.

The synthetic hormone is as effective as female sex hormone preparations from natural sources in relieving the hot flushes, emotional instability, headache and insomnia of young women whose ovaries have been removed or of middle-aged women whose glands have stopped supplying them with this hormone.

Good relief of symptoms were obtained by the synthetic hormone treatment in 128 of 150 women, the St. Louis doctors report, with fair relief in 18 and poor results in four.

The synthetic hormone can be given by mouth instead of by hypodermic injection. For most patients the best method is to give a daily dose for two weeks each month, with a two weeks' interruption of the treatment each month. This method, the St. Louis doctors point out, reduces the amount of hormone that must be given and thus cuts the cost of the treatment. It also imitates the normal cycle and presumably would simulate the normal ovarian effects on uterus and breasts and reduce any tendency to stimulating cancerous growth.

Science News Letter, November 8, 1941

New Machines And Gadgets

Novel Things for Better Living

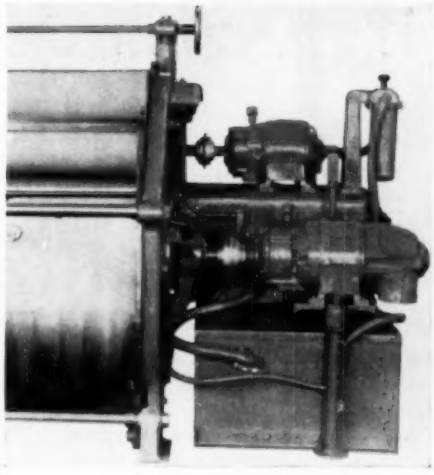
A transparent film, one-quarter of a wavelength of light, or about five millionths of an inch in thickness, is being applied to lenses and movie projectors to diminish reflections. Ordinarily about 4 per cent. of light falling on a glass surface exposed to air is reflected back and does not pass through the glass at all. In a lens combination containing eight such surfaces the light loss would amount to more than 30 per cent. In a projector, much of this light eventually reaches the screen, where it tends to wash out the picture. Hence the use of coated lenses in a double way increases the clearness and brightness of the picture.

Setting radio tubes to control the motion of heavy machinery, to keep it smooth and uniform, may seem like setting an ant to regulate the pace of an elephant. Yet they are very useful for this purpose, because of their sensitiveness, high amplifying power and practically instantaneous action. The slightest variation in speed is at once detected and the proper machinery set into operation to correct it. Prompt correction is particularly necessary in paper-making machinery where the paper, wet at first, must pass over and under innumerable rolls. A slight change in speed will tear the paper. Imagine the tenderness of wet tissue paper.

Gummed sealing tape that does not stick or does not stick strongly enough, is not to Uncle Sam's liking. So—the Bureau of Standards has a machine for testing the stick-to-it-iveness of such tape, from which specifications for government purchases can be drawn up. No tape that does not have the required sticking power need apply.

What color of lips best suits milady's complexion, her type, her mood of the moment and the rest of her ensemble? Selection of exactly the right delicate nuance of shade is made easy by an ingenious mirror just patented. In it, you may see your face. But just where your lips would appear, the silver on the back of the mirror has been removed in a manner conforming to the outline of your lips. You see through this opening a color disc which can be revolved to bring different shades into view, so that the one which looks the very best on you can be quickly and easily selected.

Unwinding cloth from one roll and winding it up on another, meanwhile passing it through a dyeing vat, is not so simple a matter as it might seem. The dyeing process requires that the



cloth travel with constant speed while other considerations demand that it be subjected to constant tension. But the roll that unwinds diminishes in diameter; for constant speed of the cloth, it must turn faster and faster. The roll that winds up increases in diameter, must turn more and more slowly. The motor that winds must increase its effort (torque) in proportion as the diameter increases. Quite a problem! However, engineers have devised motors that have just the right characteristics. One motor winds while the other acts as a drag on the unwinding roll to maintain the proper tension. They are reversible, so that the cloth can be wound back on the original roll if desired.

To prevent slipping on icy pavements, spikes are effective, but pretty uncomfortable. To the rescue comes a lady from Nebraska with a patented invention, a sort of rubber cuff of ribbed construction, wider at one end than the other. It slips snugly over the toe of the shoe and offers an excellent non-skid tread.

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 78.*

ENGINEERING

50,000,000 Watts of Power For New York City Area

See Front Cover

FIFTY MILLION more watts of electrical power will be available for New York's metropolitan area when the partly built turbine generator, shown on the front cover of this week's SCIENCE NEWS LETTER, is finished and installed. Shown in the illustration are the 90-ton outer frame and its windings, within which a rotor will spin at 3,600 revolutions per minute. The generator is being built by Westinghouse.

Science News Letter, November 8, 1941

•First Glances at New Books

ASTRONOMY

THE MILKY WAY—Bart J. Bok and Priscilla F. Bok—*Blakiston,* 204 p., illus., $2.50. The meaning of that great band of stars and of nebulous light which every night crosses the entire sky is told in this book, one of a series of nine, the "Harvard Books on Astronomy," edited by Dr. Harlow Shapley and Dr. Bart J. Bok. What we know about it and how we know it are told. Its past and future and position as a universe amid innumerable other island universes are discussed.

Science News Letter, November 8, 1941

BOTANY

A MANUAL OF THE HIGHER PLANTS OF OREGON—Morton Eaton Peck—*Binfords & Mort,* 866 p., illus., $5. A noteworthy addition to the growing list of regional and state floras. There are no illustrations, but the lack is offset by full analytical descriptions of the species. There is a helpful glossary and set of sketches illustrating technical descriptive terms.

Science News Letter, November 8, 1941

GENERAL SCIENCE

THE NEW INTERNATIONAL YEAR BOOK, 1940—Charles Earle Funk, ed.—*Funk & Wagnalls,* 819 p., $6.25; vel. $6.75; buck. $7.25. An authoritative annual volume presenting progress in all fields of human endeavor, including adequate coverage of the various branches of science. The war is fully recorded during an eventful year.

Science News Letter, November 8, 1941

BIOLOGY

BIOLOGY AND HUMAN AFFAIRS—John W. Ritchie—*World Book Co.,* 1,026 p., illus., $2.32. A textbook for high school use, placing special emphasis on the significance of biological science to the conduct of individual and community life, and endeavoring, in its opening chapters, to inculcate an understanding and appreciation of the scientific approach.

Science News Letter, November 8, 1941

GEOLOGY

SUBMARINE TOPOGRAPHY OFF THE CALIFORNIA COAST: Canyons and Tectonic Interpretation—Francis P. Shepard and K. O. Emery—*Geological Soc. of Amer.,* 171 p., 18 pl., 4 charts, $3.25. A detailed and thorough-going discussion of the interesting submarine topography off the California coast which has aroused much interest on the part of the general public as well as scientists, as it has appeared piecemeal during the past several years. Getting the whole story together in one place will make matters much more convenient for interested scientists.

Science News Letter, November 8, 1941

STANDARDS

SHOE SIZING AND FITTING: An Analysis of Practices and Trends—Carol Willis Moffett—*Govt. Print. Off.,* 31 p., 10c. See page 300.

Science News Letter, November 8, 1941

EDUCATION—SPORTS

WORKBOOK FOR PHYSICAL EDUCATION—Mae Iddins—*Mosby,* 142 p., $1.50. Designed for women college students as a brief introduction to a wide variety of sports, this book outlines directions in considerable detail. The workbook includes tumbling exercises, formal gymnastics and games.

Science News Letter, November 8, 1941

MEDICINE

THE FURTHERANCE OF MEDICAL RESEARCH—Alan Gregg—*Yale Univ. Press,* 129 p., $2. Obviously, the experiences and ideas of the author, who is director for the medical sciences for the Rockefeller Foundation, as presented in this book will be helpful to educators, trustees and directors of foundations or other institutions sponsoring medical research and to the medical students themselves about to embark on a research career. Since, however, the general public through taxes may some day be supporting the bulk of medical research, the intelligent layman should also read this book in order to get a clear view of the problem.

Science News Letter, November 8, 1941

EDUCATION

ELEMENTARY EDUCATION OF ADULTS, A Critical Interpretation—Ruth Kotinsky—*American Association for Adult Education,* 205 p., $1.50. Teaching the three R's is a different problem when the students are adults instead of six-year-olds. Here is background that will help the teacher of literacy or Americanization classes.

Science News Letter, November 8, 1941

EDUCATION

THE EXTENSION OF UNIVERSITY TEACHING—James Creese—*American Association for Adult Education,* 170 p., $1.25. Students in university extension and correspondence courses number in the hundreds of thousands. This book is of interest to instructors in this field.

Science News Letter, November 8, 1941

GENERAL SCIENCE

DEMOCRACY MARCHES—Julian Huxley—*Harper,* 126 p., $1.50. Sketches for blueprints of the New World which Dr. Huxley believes can arise from the battered civilization in which he lives. The Soviet experiment owes its success, he finds, largely to the feeling among the common people that they, by their own work, are helping to create something of value for themselves, an incentive that has been largely lacking in our laissez-faire democracies. "Inevitably, after the war, we shall have to face a long period of hard work and low standards of living. But it will harness new forces of human nature, which have not been given due scope during the laissez-faire age of economic man; it will harness them on a mass scale, and in the service of hope."

Science News Letter, November 8, 1941

AERONAUTICS

AIRCRAFT RECOGNITION—R. A. Saville-Sneath—*Penguin,* 174 p., 25c. In England where this book originated it may be a matter of life or death to recognize correctly an airplane overhead. This rather grim game of spotting airplanes from the figures they cut in the sky may well be practiced here because we don't know when we shall need the skill of observation that it develops. Quite a number of American planes are included along with British and German military craft.

Science News Letter, November 8, 1941

JOURNALISM

MODERN PUBLICITY IN WAR (MODERN PUBLICITY, 1941)—F. A. Mercer and Grace Lovat Fraser, eds.—*Studio,* 128 p., illus., $4.50. Advertising under Britain's blitz, a compilation of the British best in display advertising, exhibits, films, posters, etc. for business, trade and general purposes, not forgetting the official propaganda.

Science News Letter, November 8, 1941

BIOLOGY

BIOLOGICAL SYMPOSIA, Vol. II, Speciation. Defense Mechanisms in Plants and Animals. Biological Basis of Social Problems. Regeneration—Jaques Cattell, ed. —*Cattell Pr.,* 270 p., $2.50. A second volume in a series that promises to become a significant record of current developments in biological science. See also page 302 and S.N.L., July 6, 1940 and July 26, 1941.

Science News Letter, November 8, 1941